

*FY 2005 NASA Budget:
A Vision of Exploration with Fewer Explorers*

C. Dermer
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With the FY2004 budget only recently passed by Congress, attention now turns to the president's proposed FY2005 budget. The president has laid out a new vision of exploration, and what this means in practice is a budget plan that conforms to this vision. Unlike previous years where OMB primarily developed NASA's budget with input from NASA, this year's budget was a result of agency involvement at the highest levels, including the White House, key congressmen, the NSA, the NASA administrator Mr. O'Keefe, and Dr. Marburger of OSTP. This led to the "Presidential Directive on Space Exploration," and a restructuring of priorities within the Office of Space Science.

Background: NASA is located in the Department of Veteran Affairs, Housing and Urban Development, and Independent Agencies. The proposed 16.2 B\$ FY05 budget represents a 5.6% increase over the 15.4 B\$ FY04 budget, and represents 0.7% of the 2.4 T\$ FY05 federal budget. The NASA budget is 0.7% of entire federal budget, which divides into a 36.0% discretionary portion and a 64.0% portion comprising mandatory spending (e.g., social security) and interest on the federal debt.

When Mr. O'Keefe became administrator, NASA's mission was stated to be:

- To understand and protect our home planet
- To explore the universe and search for life
- To inspire the next generation of explorers
- ...as only NASA can

The *Beyond Einstein* (BE) roadmap, which is the Structure and Evolution of the Universe Program, was developed to support this mission.

President Bush has announced a new vision of exploration, which is enunciated in the document entitled "A Renewed Spirit of Discovery." The main goals of this vision are

- To return to flight with the space shuttle;
- To complete the International Space Station and honor international obligations, and then to retire the shuttle;
- Develop a crew exploration vehicle and a cargo vehicle; and
- Return to the moon, and use it as a site for further missions, in particular, to Mars

This vision is not science-driven, but is science-enabling. The vision is not refocused on fundamental physics. There are only modest increases in the budget, but no current programs are canceled.

A reprioritization of programs is required to facilitate the new vision of exploration, and a new theme in OSS is added: the *Lunar Exploration Program*. Thus there are now 6 themes in OSS:

1. Solar System Exploration (robotic missions to explore the Solar system)
2. Mars Exploration Program
3. Lunar Exploration Program
4. Astronomical Search for Origins (ASO)
5. Sun-Earth Connection (SEC)
6. Structure and Evolution of the Universe (SEU)

The budgets have been reduced in SEC and SEU to accommodate the new Vision. Because ASO entails the search for extra-solar planets, it arguably fits within this vision. Regarding ASO, JWST has added dollars for a 2011 launch, and is fenced from cost overruns elsewhere. As is by now well known, SM4 was cancelled, and the *HST* lifetime is extended while an autonomous vehicle is developed to attach a reentry vehicle to the telescope. SIM and R&A are fully funded, and there is no change on TPF.

The good news for SEU is that additional funding is provided for GP-B to support an April launch date, and to cover cost growth for Swift and GLAST to support the 2004 and 2007 launch dates, respectively.

The bad news for SEU is that the BE funding is seriously impacted, leading to a one-year slip of the launch of LISA from 2011 to 2012, and a slip of the Con-X launch date by two years, to the 2016 time frame. The Einstein probes are deferred indefinitely, with 0\$ now in the budget for the probes. Note that they are not cancelled, and research and technology development can still be performed. NASA OSS is going forward with mission concept studies, and money will be sent out. Regarding JDEM, the NASA/DOE Joint Dark Energy Mission, there is no budget to proceed to develop this program, so it is also put on hold.

Whatever little good news there is in this is that BE has a funding line, even though it is at \$0. This is a major hurdle that has been cleared, so that the program itself does not need to be resold; only the budget needs augmentation.

Now to the Explorer program: It didn't clearly support the president's vision, insofar as NASA's goals have changed. The budget cannot support a 2007 launch date, so the current SMEX selection aims at a 2008 launch date, and delaying the next MIDEX beyond 2010.

The baseline plan for the Explorer program was:

1. Downselect two SMEX's for launch in 2007 and 2008
2. Issue an AO this year for MIDEX's to launch in 2010 and 2011

Two options are now presented:

Option A:

1. Downselect two SMEX's for launch in 2008 and 2009
2. Issue an AO in 2006 for MIDEX's to launch around 2012 or later

Option B:

1. Downselect one SMEX for launch in 2008
2. Issue an AO in 2005 for one MIDEX to launch around 2011

(Note that because costs have to be presented within a 5-year profile, budgets are often developed so that major costs are incurred beyond the 5-year budget horizon.)

Other issues with regard to the Explorer program is that NASA is taking delivery of COS and WF3, the 200M\$ worth of instrumentation that were to be installed on *HST* during SM4. They are offered in competition—in whole or in part—in the Explorer program, though they are only suitable for MIDEXes.

Regarding the other programs and themes, there will now be three program directors for the Moon, Mars, and JIMO programs. The Lunar program will be controlled by OSS. Because the Sun has an influence on human travel, SEC fared better than it might have: LWS is fully funded, though the number of Solar-terrestrial Probes is stretched out. Earth science fared poorly in the NASA budget.

For SEU scientists, note that the ROSS '04 continues without change; and there are increases for theory in mission-specific programs. To advance BE, we now have to reformulate a strategy where SEU science fits within the Exploration vision. The Roadmapping process begins soon: a 42-month process that must be completed every 36 months. Or it is like painting the Golden Gate Bridge: once you finish, you start again. Science as Sisyphus...

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